



development, Gender Development Index, Human Development Index

Module 2. Theories in development

- Modernization – W.W. Rostow
- Dependency theory – Samir Amin
- World System – Immanuel Wallerstein
- Alternative development – M.K. Gandhi, E.F. Schumacher

Module 3. Rural and Urban development

- Rural social structure, Agrarian relations, Green revolution, Urbanism, Urbanization, Suburb, Metropolis, Cities, Towns, Slums, Rural and Urban development programmes in India, Population dynamics and Challenges – fertility, morality, migration, demographic transition

Module 4. Development Experience in Kerala

- Land reforms, Socio-political movements in Kerala, Land struggles, Kerala development model – education, health, social security
- Decentralization process – 73rd & 74th amendment, peoples planning and emergence of local governance in Kerala
- Migration and Kerala diaspora

Unit VI Globalization and Emerging Challenges

Module 1. Understanding Globalization

- History and characteristics, Agencies of globalization, Global village, Consumerism, McDonaldization, Effects of globalization on marginalized communities, Development induced displacement, New Social Movements in the context of globalization

Module 2. Media and Communication

- Mass media in a globalized world, Corporate media, Globalization of news, Cultural imperialism through media
- Information, Communication and Technologies (ICTs) – digital media, digital divide, social media, cyber media, net neutrality, social networks and virtual

communities

Module 3. Changes in Industry and Industrial management

- Industry in a globalized world, MNCs and outsourcing and its impact, New management principles, Corporate Social responsibility (CSR), Industrial pollution, e-waste and waste management

Module 4. Impact on environment

- Environmental degradation, Climate change and its impact, Global warming, Ozone depletion, Global movements and discourses, Initiatives of state and International agencies – Stockholm, Rio and Kyoto Summits

31. Statistics

Unit I Mathematical Methods for Statistics

Module 1.

- Sets, set of real numbers, functions, sequences and series of real numbers, their limits and convergences. Continuous functions, discontinuities of functions, bounded functions, conditions for differentiability of functions, Riemann integrals and properties.

Module 2.

- Cartesian product of sets, metric space, open and closed sets, limit points, closure of a set, complete metric space, Heine-Borel theorem.

Module 3.

- Linear space, subspaces, linear dependence and independence of vectors, basis and dimension, linear transformation in vector space, normed linear space.

Module 4.

- Matrices, different types of matrices, algebra of matrices, adjoint of a matrix, inverse of non-singular matrices, g-inverse, rank and determinant of matrices, solving linear



equations by matrix method, eigen values and eigen vectors, Cayley-Hamilton theorem. Quadratic forms and their definiteness.

Module 5.

- Classes of sets, limit superior, limit inferior and convergence of sequence of sets, ring, monotone class, field and sigma field of sets, general definition of measure, Lebesgue and Lebesgue-Stieltjes measures. Measurable sets and measurable functions, definition of integral, Lebesgue and Lebesgue-Stieltjes integrals, properties, convergence theorems, applications of Radon-Nikodyn theorem.

Unit II Probability Theory

Module 1.

- Definitions of probability (classical, frequency ratio and axiomatic approaches), classes of events, probability measure and properties, independence of events, pairwise and mutual independence of events, addition theorem of probability.

Module 2.

- Conditional probability, multiplication theorem, Bayes' theorem and applications.

Module 3.

- Random variables, cumulative distribution function and properties (both univariate and bivariate cases), decomposition of a distribution function, probability density function and probability mass function, discrete and continuous random variables, independence of random variables, connection between distribution function of a random variable and Lebesgue-Stieltjes measure.

Module 4.

- Expectation and moments of random variables, properties, moment generating function, cumulant generating function, characteristic function, probability

generating function and their properties, inversion theorem on characteristic functions.

Module 5.

- Chebychev and Liapunov inequalities, Borel-Cantelli lemma, Borel zero-one law. Convergence of sequences of random variables: weak convergence, convergence in probability, convergence in r^{th} mean and almost sure convergence, and their mutual implications. Laws of large numbers and central limit theorems.

Unit III Distributions in Statistics

Module 1.

- Bernoulli, binomial, Poisson, geometric, negative-binomial, discrete uniform, hypergeometric, multinomial and power series distributions - properties and characteristics of these distributions.

Module 2.

- Rectangular, exponential, gamma, beta (type I and type II), normal, log normal, logistic, Laplace, Pareto, Weibull and Cauchy distributions-properties and characteristics of these distributions.

Module 3.

- Functions of random variables and their distributions, distributions of sum, product and ratio of independent random variables. Order statistics, basic distribution theory, joint and conditional distribution of order statistics, distribution of order statistics arising from uniform and exponential distributions-properties.

Module 4.

- Sampling distributions - standard error, distribution of mean and variance of samples from normal populations. Exact sampling distributions- chi-square, t and F (central and non-central), inter relationships between these distributions and their applications (including significance tests).

**Module 5.**

- Bivariate distributions: discrete, continuous and mixed forms, marginal and conditional distributions. Bivariate normal distribution and its characteristics, simple correlation and regression, their properties and tests.

Unit IV Estimation and Testing of Hypotheses

Module 1.

- Point estimate, properties of estimators: unbiasedness, consistency, sufficiency and efficiency, Cramer-Rao inequality, estimators attaining minimum variance bound, Rao-Blackwell and Lehmann-Scheffe theorems, minimum variance unbiased estimation.

Module 2.

- Methods of estimation: maximum likelihood, method of moments and least-squares method and their properties, comparison of these estimates in normal population. Minimum chi-square and modified minimum chi-square methods.

Module 3.

- Basic concepts of hypothesis testing, type I and type II errors, critical region, power of a test, Neyman-Pearson lemma, MP and UMP tests, likelihood ratio test, MLR property, asymptotic distribution of likelihood ratio, tests for mean and variance of normal populations, tests for proportions.

Module 4.

- Non parametric tests: advantages and disadvantages of non parametric tests, binomial, sign, Wilcoxon signed-rank, one and two sample Wald-Wolfowitz run, median, Kolmogorov-Smirnov (both on sample and two sample), Mann-Whitney U, Kruskal-Wallis tests and Friedman's two way analysis of variance test. Sequential probability ratio tests: basic concepts, testing single parameter case for normal, point

binomial and exponential distributions.

Module 5.

- Interval estimation: basic concepts of interval estimation, shortest length confidence interval, interval estimates of parameters based on normal distribution, connection between interval estimation and testing of hypotheses. Bayesian estimation: prior and posterior distributions, conjugate priors, loss and risk functions, Bayes estimation of the parameters under squared-error and absolute error loss functions.

Unit V Sample Surveys and Design of Experiments

Module 1.

- Planning and execution of sample surveys, sampling and non sampling errors, simple random, stratified random, systematic and cluster sampling methods, estimation of the population characteristics by these sampling methods. Sample size determination.

Module 2.

- Unequal probability sampling methods, PPS sampling with and without replacement. Des Raj ordered, Murthy's unordered and Horvitz-Thompson estimators and their standard errors. Ratio and regression methods of estimation.

Module 3.

- Linear models, estimability of linear parametric functions, Gauss-Markoff theorem, tests of linear hypotheses, Analysis of variance, criteria for connectedness, orthogonality and balance.

Module 4.

- Basic principles of experimentation, standard designs-CRD, RBD, LSD and GLSD, analysis and efficiency comparisons. Analysis of covariance in CRD, RBD and LSD, missing plot techniques.



Module 5.

- Factorial experiments: 2^n and 3^n experiments, partial and total confounding in the above experiments. Incomplete block designs: BIBD, analysis with and without recovery of inter-block information.

Unit VI

**Multivariate Analysis,
Stochastic Processes and
Index Numbers**

Module 1.

- Multivariate normal distribution, marginal and conditional distributions, characteristic functions, distribution of quadratic forms in normal variables, Partial and multiple correlation, multiple regression technique.

Module 2.

- Samples from multivariate normal distribution, maximum likelihood estimators of the parameters and their distributions. Hotelling's T^2 and Mahalanobis D^2 . Testing the mean vector of a multivariate normal distribution and the equality of means of two multivariate normal distributions.

Module 3.

- Stochastic processes-Definition and classification of stochastic processes based on state and time spaces, Processes with stationary independent increments, Markov processes, Gaussian processes. Markov chains: transition probability matrices and Chapman-Kolmogorov equation, classification of states: periodicity, recurrence, ergodicity and stationarity.

Module 4.

- Continuous time Markov processes: Poisson process, pure birth process, birth and death process. Principles of queuing theory- M/M/1 and M/M/s models.

Module 5.

- Time series analysis: components of time series, measurement of secular trend and

seasonal components. Index numbers-simple and weighted index numbers, tests for an ideal index number, cost of living index.

32. Syriac

Unit I

**Syriac Grammar,
History and Structure of
Syriac Language**

- Syriac Scripts: Estrangela, East Syriac and Serto
- Orthography
- Vowel expression by vowel letters and other signs.
- Consonants: Rukakka, Qussaya
- Loan words in Syriac
- Syntax in comparison with Indian languages.
- Jacob of Edessa's letter on Syriac Orthography
- Gregory Bar Hebraeus: Syriac Accents
- Grammatical Terminology in Syriac
- Syriac Calligraphy
- Phonology
- Morphology
- Syntax
- Parts of Speech
- Semantics
- Grammar and Grammatical categories

Unit II

**Syriac Poetry and
Liturgical Literature**

- Early Syriac poetry
- Main categories of Syriac poetry
- Hymnody: Kinds of Hymns (West Syriac): (Mimre, - Madrosho, - Qole, - Onitha, - Mazmure, Zmirto, - Tesbehoto, - Sebloto, - Bothe, - Bo'oto, - Takshepto, - Quqoyo, - qonuno Yawnoyo)
- Hymnody: Kinds of Hymns (East Syriac): (Barrek(u), Basaliqe, Bauta, ba'wata, B-rasit, Gazza, Giyyora, Hepakta, Hullala, Hallelayn(i),